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ABSTRACT

Five activities are presented in this student workbook on using the electronic calculator. Following the directions for using the machine, problems are given on multiplying and dividing, finding percentages, calculating the area of assorted polygons, changing fractions to decimals, and finding squares and square roots. (JH)

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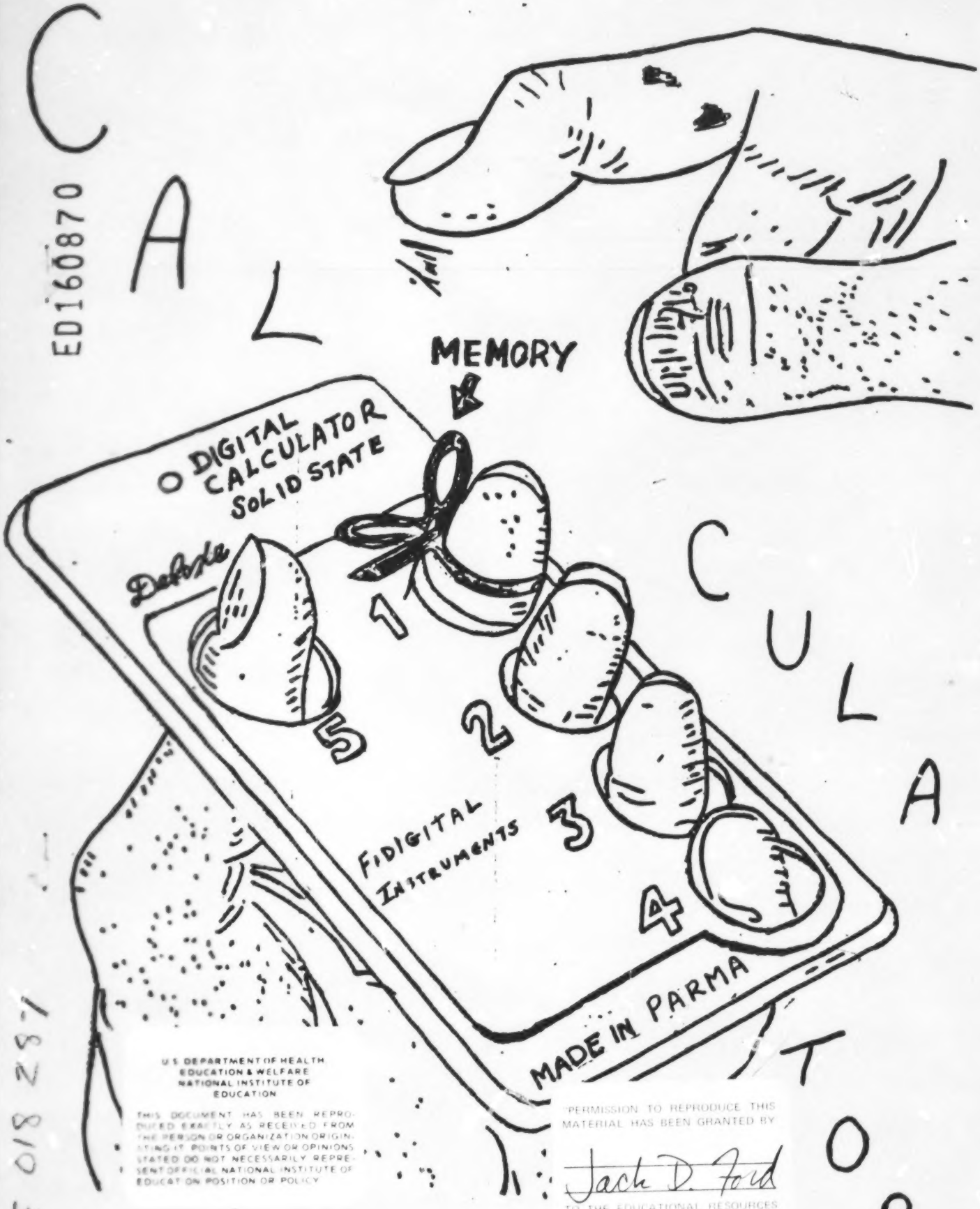

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CE 018 237

THE CALCULATOR

"An extention of the human mind!"

The average person could lift or move objects that weigh about 150 to 200 lbs. With the discovery of the lever his ability to move objects was extended 5 times.

Many people can run at a rate of 12 miles per hour. With the invention of the automobile the ability to travel was extended 10 times.

But with the invention of the calculator, people's ability to think and compute has been extended a thousand times. Computations that once took hours now can be achieved with greater accuracy in minutes.

The ability to learn, to explore, to discover, and to create has been freed from the conventional bounds of his ability to work with paper and pencil.

Space has been regarded as the last frontier, but with the invention of the electronic calculator, we are now able to explore new horizons - so vast they are limited only by our imagination.

Noah Monsour

WHY THE CALCULATOR?

As the hand-held calculator invades Ohio classrooms, teachers are finding themselves faced with decisions about its proper use. Recent technological advances have made highly reliable calculators available for less than $10, which has added to their popularity for school as well as personal and professional use.

The Ohio Council of Teachers of Mathematics (OCTM), in recognition of this, adopted a resolution recently with a series of recommendations for calculator use in the schools. "The hand-held calculator cannot be considered a fad", according to OCTM president Richard Little. "There are approximately 100 million calculators in use in the United States at the present time. We who are teaching mathematical concepts must take them into account."

"The OCTM believes that where mathematics specialists are teaching courses for seventh grade and beyond, the calculator should be an important instructional devise," said Little, who is a mathematics professor at Baldwin-Wallace College.

One objection to calculator use in the classroom has been the possibility that students will substitute the machine for learning basic mathematics computations. The OCTM passed a resolution suggesting that the calculator be used as a teaching devise to enhance basic mathematics computations. The student according to the resolution, should still be expected to develop the ability to perform basic paper-and-pencil logarithms and to perform mental computations.

In the report, Overview and Analysis of School Mathematics Grade K-12, a nine member advisory board urges that "calculators in no way diminish the importance of school mathematics instruction, but instead allow students to feel the power of mathematics and free time for teachers to concentrate on the conceptual aspects of the subject which are of fundamental importance." "Simply stated, given a practical life situation involving computation it is vitally more important for a human being to know what operations and the order in which they are to be performed, than to perform the rote computations.

The calculator takes on an added dimension in secondary schools and schools of higher learning. At the high school level the calculator has potential in a variety of subjects other than mathematics. For college students, the calculator can be of significant aid in math and science classes as well as doing research work for almost any course offering.

James Huber, resource mathematics teacher in the Columbus school system, sees contemporary teachers allowing students to use calculators to verify answers and to attempt more realistic math problems. Huber feels that use of calculators will restructure classroom activities. More emphasis can be run more than once to verify results.

Why offer a calculator course. The reason is obvious. It is impossible to ignore the presence of 100,000,000 presently used calculators in numerous aspects of daily life and then not adequately prepare students to proficiently use them.

SHARP

CALCULATOR

SHARP CALCULATOR UNIT

GOAL: This unit will enalbe the student to program a simple routine into the sharp electronic calculator.

OBJECTIVES:

1. Given a flow chart on a routine for multiplying the student will execute the program by constant or complete set of problems, then he will rewrite the routine for dividing by a constant.

2. Given a routine for finding the percentage of a given problem, the student will complete a set of problems, then he will rewrite the routine for calculating the rate.

3. Given a routine for finding the area of a triangle, the student will complete a set of problems, then he will write a program for finding the area of another polygon.

4. Given a routine for changing a fraction into a decimal, the student will execute the program to complete a set of problems.

5. Given a program for calculating the square root of a given number the student will execute the program to complete a set of problems, and then rewrite the routine to find the square--of a given number.

ACTIVITIES:

1. Routine multiplying or dividing

2. Finding percentage

3. Area of assorted Polygons

4. Changing Fractions to decimals

5. Finding Squares and square roots.

FEATURES ABOUT THE MACHINE

1. The "on" switch is on the left side of the calculator.

2. You should remove the gray plastic cover on the paper roll so the paper won't bunch up as it comes through.

3. Make sure the "PRT" button on the top of the machine is not depressed. If it is, press it and it will pop up. When down, it prints every detail of the problem which is not necessary and wastes the zinc paper.

4. Clear Keys:

   C - Clears the problem

   CE - Clears the number entered

   CM - Clears Memory

   CA - Clears all (entries, programs, and memories)

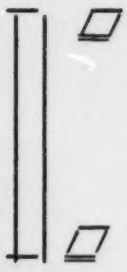
   CP - Clears that particular program

   X --M - Clears memory and enters your number into memory banks.

5. There are 4 memory numbers in blue on top of the key board.

6. In programming, use H key to enter your variable "H" stands for halt.

7. Program Switch Lever



   PRO ----- Calculator is ready for programming

   N ------- Neutral position

   CHE ----- For checking the program

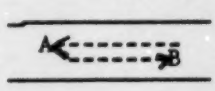
   DEB ----- For Debugging and correcting the program

   A ------- Machine works automatically like a calculator

8. If you wish to record your program for future use, place a magnetic card, white side up, into slot near display, press "record". The card will go in and out of the machine.

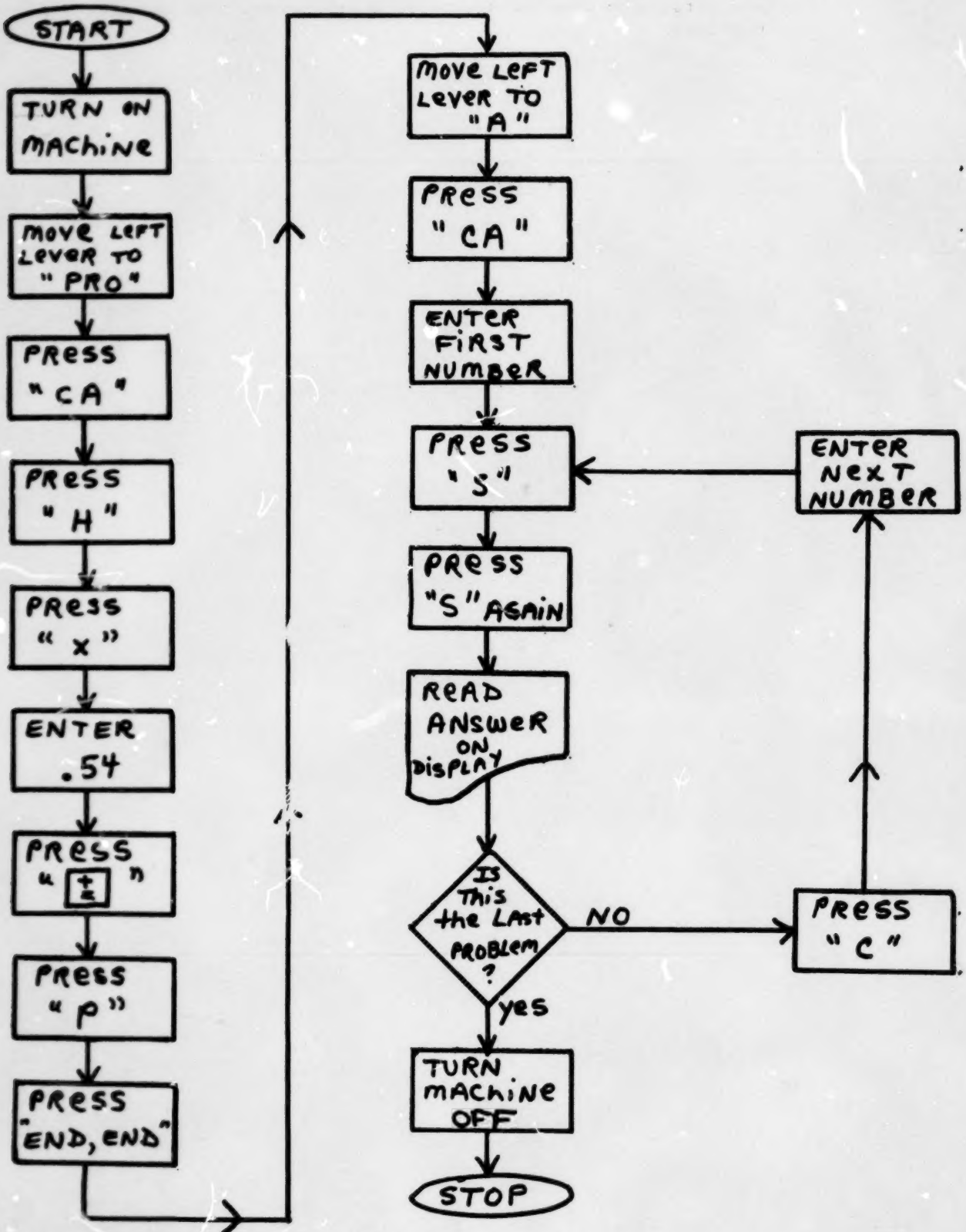
   Remove the card; write the name of program and its formula on the appropriate lines.

   DO NOT notch out the card.



9. For more details on this machine refer to the instruction manuals and workbboks.

ROUTINE MULTIPLYING OR DIVIDING



ROUTINES MULTIPLYING OR DIVIDING NAME _____

Suppose we wish to find the cost for gas for an automobile for a twenty week period. Use the flow chart on the previous page to complete the following problems.

Gasoline costs 54¢ per gallon.

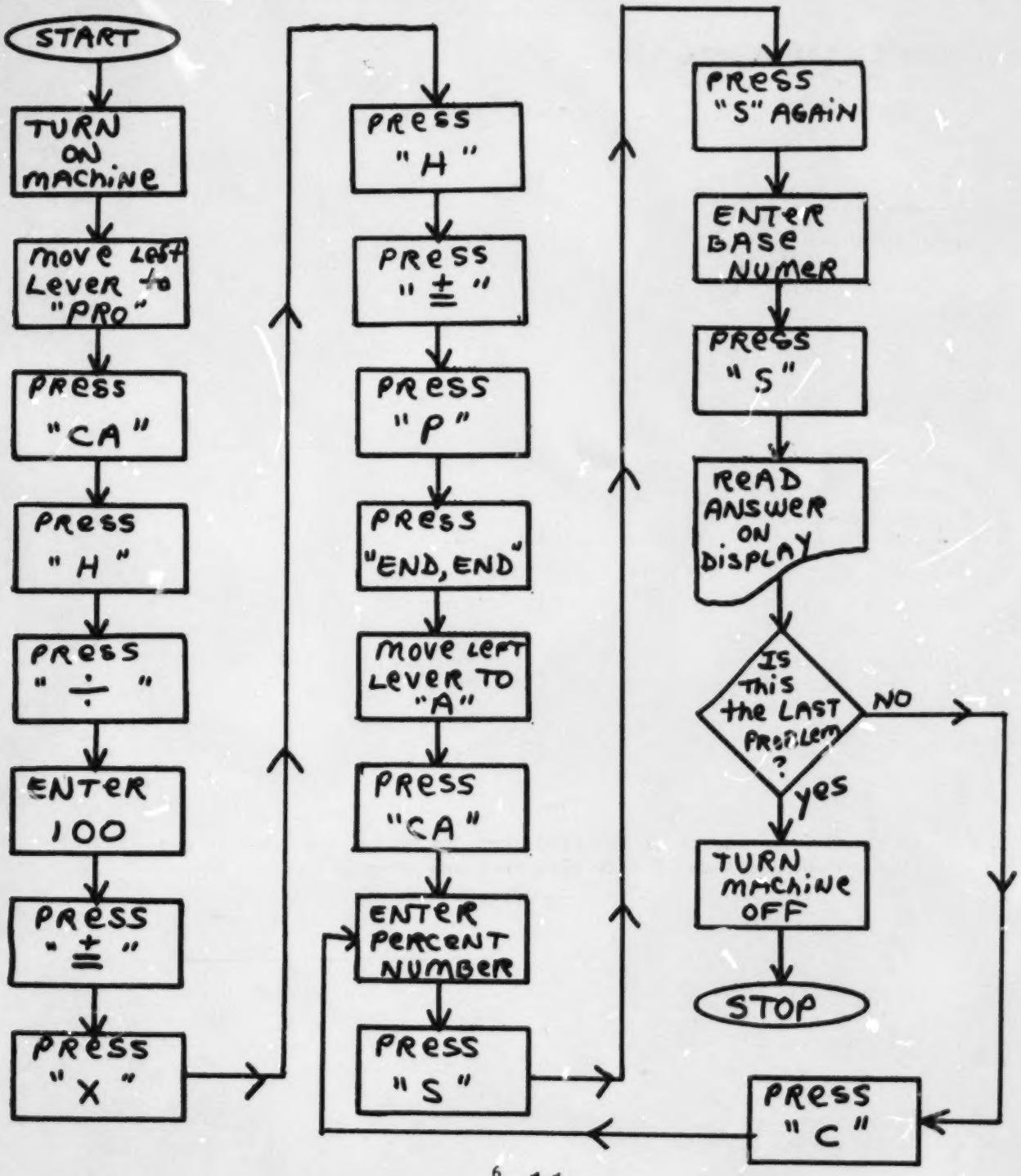
1. 62
2. 84.7
3. 109
4. 115.5
5. 94.16
6. 81.27
7. 116.3
8. 20.61
9. 73.6
10. 111.5
11. 11.8
12. 77
13. 197.6
14. 33.16
15. 166.05
16. 78.83
17. 112.5
18. 76.72
19. 142.2
20. 93.7

21. Now--rewrite on the blocks of the flow chart to change the cost of gas 67¢ per gallon. Redo problems 1 - 20 with this new amount.

FINDING PERCENTAGE

PERCENTAGE = BASE X PECENT

EXAMPLE: WHAT is 50% of 200? ANS: 100



FINDING THE PERCENTAGE NAME _____

Use the flow chart on the previous page to complete the following:

1. 50% of 300
2. 60% of 200
3. 75% of 1000
4. 30% of 90
5. 22.7% of 450
6. 18% of 92.1
7. 65% of 1500
8. 32% of 75
9. 250% of 10
10. 16% of 180
11. 94% of 6,000,000
12. 81% of 15.2
13. 67% of 2,369
14. 42% of 16,321, 894, 774, 223
15. 33.3333333% of 18
16. 21% fo 6,000
17. 59% of 150
18. 24% of 76
19. 200% of 1976
20. 62% of 13

For Enrichment:

See if you can rearrange the blocks of the percentage flow chart to find the percent of a problem given the base and percentage.

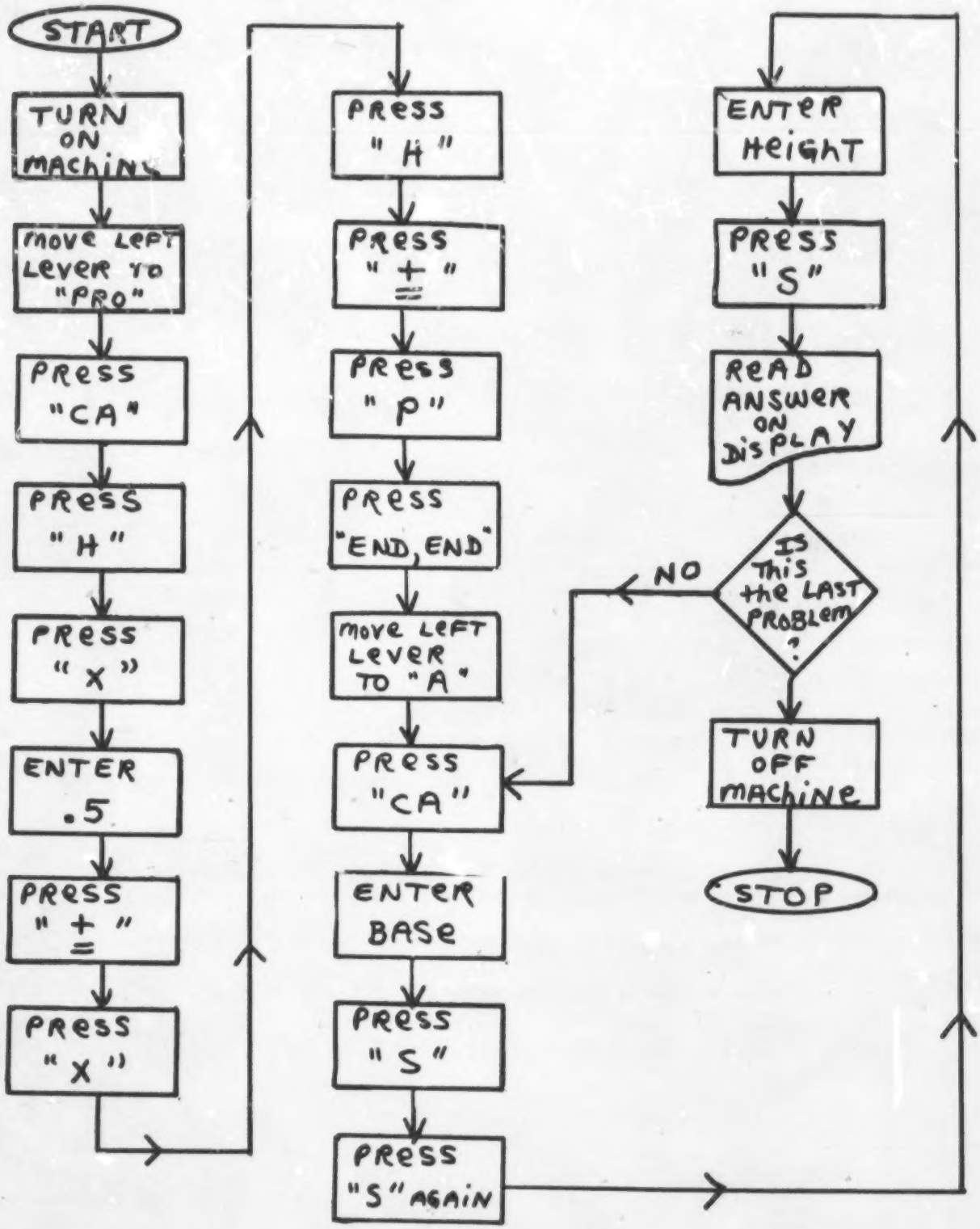
Example: 80 is what percent of 160? Answer: 50%

What operation is needed to do this problem? 80 ? 160 = 50/100

Remember, 50% really means 50/100 or .50

AREA OF ASSORTED POLYGONS

PARTICULARLY: <u>The TRIANGLE</u>: $A = \frac{1}{2} \cdot B \cdot H$



AREA OF ASSORTED POLYGONS NAME _____

Using the flow chart for area of a triangle, complete the following:

	Base	Height	Area
1.	16	20	
2.	15	18	
3.	20	40	
4.	92	61	
5.	180	900	
6.	675	829	
7.	30	85	
8.	64	72	
9.	199	98	
10.	41	678	
11.	428	999	
12.	76	94	
13.	201	845	
14.	66	33	
15.	834	296	

For Enrichment, rewrite the flow chart for the area of a parallelogram:

$A = \frac{1}{2} \cdot (B_1 + B_2) \cdot H$; or a circle $A = R^2$

14

CHANGING FRACTIONS TO DECIMALS

EXAMPLE: WHAT IS $\frac{3}{4}$ AS A DECIMAL NUMERAL?

$3 \div 4 = 4\overline{)3.00}$ (.75)

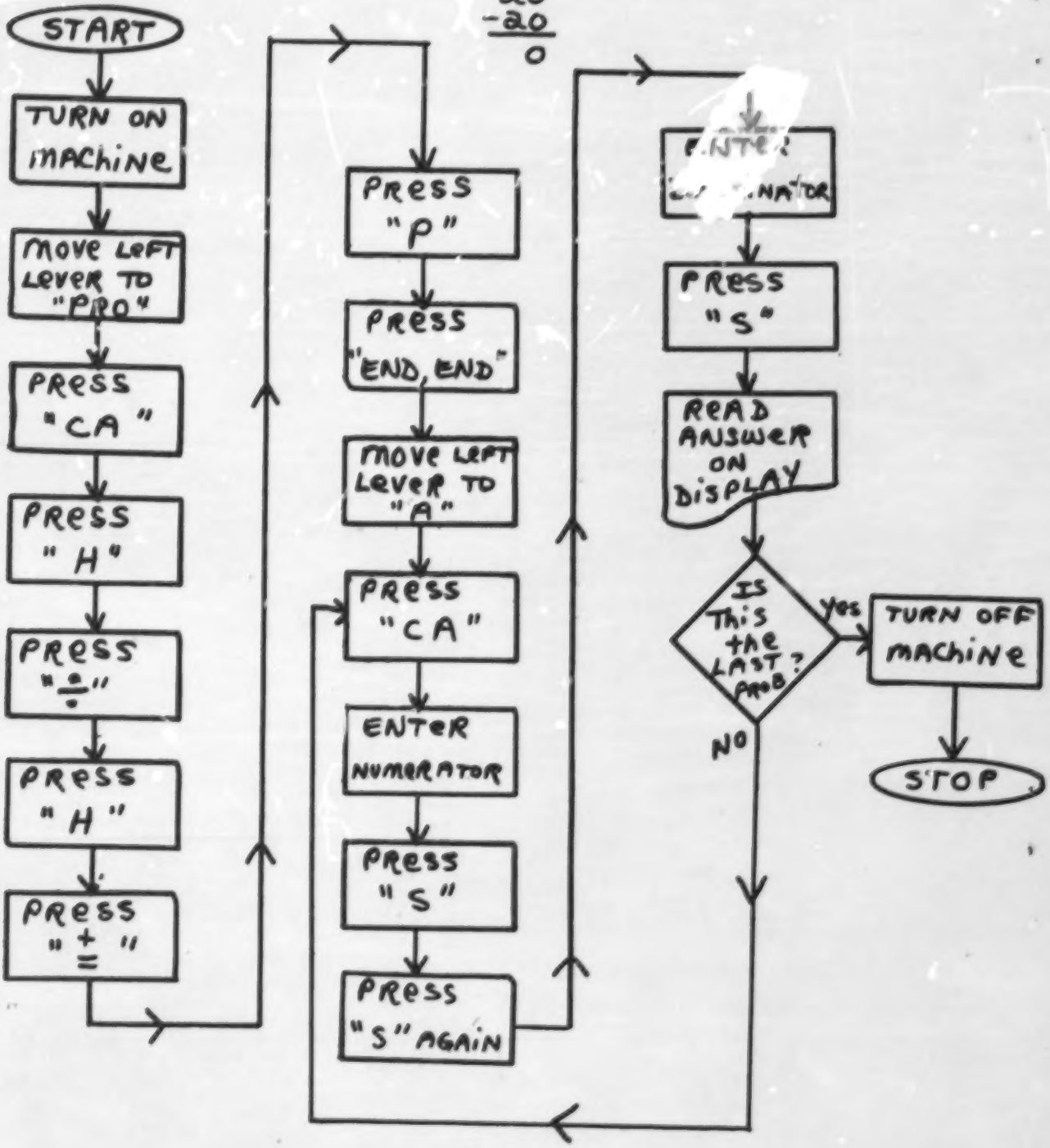
-28

20

-20

0

ANS: .75



FINDING SQUARE ROOTS NAME_____

Use the flow chart n the previous page to find the square roots of the following:

1. 36
2. 25
3. 72
4. 84
5. 144
6. 121
7. 39
8. 45
9. 625
10. 256
11. 215
12. 10,000
13. 342
14. 145
15. 992
16. 214
17. 100
18. 64
19. 49,186
20. 92,817

For Enrichment, Redo the routine to find the Squares of each of the above problems.

CHANGING FRACTIONS TO DECIMALS NAME _____

Use the flow chart on the previous page to change these fractions to decimals:

1. 1/8
2. 1/7
3. 2/10
4. 1/9
5. 1/6
6. 2/25
7. 6/13
8. 2/9
9. 3/4
10. 1/30
11. 4/50
12. 2/15
13. 20/30
14. 16/8
15. 9/7
16. 6/7
17. 4/21
18. 1/50
19. 4/13
20. 5/25

FINDING SQUARE ROOTS :